

Social Dilemmas and Social Decision Making

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### Abstract

With the current study, we sought to add to the vexing study of human cooperation by exploring the following questions: 1) (how) does experiencing a social dilemma influence subsequent decision making, and 2) (how) does experiencing betrayal vs. loyalty in a social dilemma influence follow up decisions. We hypothesized that both, experiencing a social dilemma in and of itself, and that experiencing betrayal within a social dilemma, would negatively influence subsequent pro-social decision-making. To test these hypotheses, we conducted a laboratory study ( $N = 197$ ) where participants were randomly assigned to one of three experimental conditions. In the first two conditions, subjects participated in a modified Prisoner's Dilemma where they believed an in person partner either cooperated (loyalty) or defected (betrayal). In the third condition, subjects did not experience a social dilemma. Next, we asked participants, in an ostensibly unrelated task, to make a social decision. Results confirmed our first hypothesis. Participants that experienced a social dilemma (vs. those that did not) were twice as likely to make a selfish (vs. pro-social) choice in the social decision in task two. Our second hypothesis was unsubstantiated. There was no direct effect for betrayal on pro-social decision-making. The results of this study demonstrate how social dilemmas influence moral judgment.

### Social Dilemmas and Social Decision Making

The study of human cooperation has proven to be one of the more important and challenging puzzles of human behavior (Tomasello, 2009). A wealth of multi-disciplinary research has examined why people irrationally risk their own health and prosperity for the benefit of others (Rand & Nowak, 2013). This research has resulted in a plethora of explanations as to why people cooperate (Bernhard, Fehr, & Fischbacher, 2006; Trivers, 1971). Here, we approach this question from a fresh perspective by integrating theory from the fields of moral psychology (Bazerman, & Tenbrunsel, 2010; Bartels, Bauman, Cushman, Pizarro, & McGraw, 2015) and self-control (Carver & Scheier, 1998; Forgas, 2011; Baumeister, Muraven, & Tice, 2000) with methods from behavioral economics (i.e., economic games; Camerer, 2014), to understand how merely experiencing a social dilemma influences subsequent social decision-making.

#### **Social dilemmas as incubators of social decision-making**

Researchers interested in understanding the puzzle of cooperation have relied heavily on experimental economic games (i.e., simulated social dilemmas; Dawes, 1980; Hardin, 1968; Parker et al., 1983) to model “social decision-making” — tradeoff decision-making that pits self-interested and utilitarian motives against one another; e.g., Engel, 2011; Forsythe, Horowitz, Savin, & Sefton, 1994; Poundstone, 1992. These games have allowed researchers to study the factors that influence cooperation by systematically examining the relationship between psychological, social, and environmental variables and social decision-making. The social dilemmas that these games create have helped illuminate the psychological processes that underlie human moral judgment and social behavior. Moreover, the games themselves are flexible enough to act as both experimental outcomes, and independent variables (Hardin, 1968;

Rand, Greene, & Nowak, 2012; Johnson & Mislin, 2011).

Research using simulated social dilemmas typically involves the employment of an experimental manipulation followed by a social decision in the context of a simulated dilemma (Van Lange, Joireman, Parks, & Van Dijk, 2013). For example, in a 129 study meta-analysis conducted on the use of the dictator game – a two-person, one-choice, social dilemma paradigm – Engel (2011) noted that there were over 619 different treatments (i.e. manipulations) used to understand the factors that influence unilateral social decision-making. These manipulations covered the entire social-psychological spectrum, from altering the incentive structure, to comparing demographic differences, and changing the power dynamics to using money instead of tokens. Research using the Prisoner's Dilemma – a widely used and efficacious, two-person interdependent social dilemma (Poundstone, 1992) - has shown how factors such as relational context, perceived trust and likability, and cultural context influences moral judgment, cooperation, and resource distribution (Andreoni & Miller, 1993; Axelrod, 1980; Bower, Garber, & Watson, 1996; Fleiß Leopold-Wildburger, 2013; Martin, Gonzalez, Juvina, & Lebiere, 2014; Mojolo et al., 2006; Sowden, Shamim, Calabrisotto, Kross, & Hofmann, in-prep).

In another meta-analysis, Balliet, Parks & Joireman (2009) found eighty-two lab studies in which a social dilemma (e.g. prisoner's dilemma, public goods dilemma; Dawes, McTavish et al., 1977, resource dilemmas such as the commons dilemma; Hardin, 1968) was employed to measure interactions between social value orientation and social behavior. These studies differed from one another along a variety of dimensions, including the operationalization of different types of social dilemmas to examine additional dimensions of cooperative and non-cooperative behavior, the employment of single or multi-round (iterated) paradigms (Andreoni & Miller, 1993; Majolo et. all 2006), and the inclusion or exclusion of monetary payments for outcomes in

lab based social dilemmas (business mindset creation in studies with real monetary payments; Biel & Thorgersen, 2007). Moreover, while Balliet, Parks, & Joireman (2009) do not go into detail about the specific ways in which experimental manipulations differed between individual studies, other research has described the means through which social dilemma experimental manipulations differ from one another (Biel & Thorgersen, 2007; Balliet & Van Lange, 2013).

From Morris, Sim, & Girotto (1998)'s work exploring the effects of control and matching heuristics on cooperation decisions, to Camera & Casari's (2009) altering of amounts of information provided to different groups of players in order to generate subsequent differences in cooperation levels, research carried out using social dilemmas frequently employs experimental manipulations prior to the player making a decision within the dilemma. These manipulations are developed in accordance with the researchers' overarching study goals, and the effects the manipulations have on social behavior and decision-making (e.g. to cooperate or defect in the Prisoner's Dilemma) are measured.

### **Social dilemmas as social influence**

For the current study we propose that along with being "test-tubes" for modeling social-decision-making outcomes, economic games are also useful in modeling social influence as a predictor of social decision-making. Social influence can be generally defined as the ways in which one individual can influence the emotions, opinions, behaviors, or decisions of another, and a large body of research has documented its influence on social decision-making (Cialdini & Trost, 1998). As noted earlier, the Prisoners Dilemma is an interdependent situation where each player's decision to either be selfish (self-interest maximization) or cooperative (group-interest maximization) plays a role in determining the outcome of a game. It is this tension that makes the Prisoners Dilemma, and every other economic game, in and of itself a prime vehicle for

modeling social influence.

Moreover, in a large experiential sampling study, Hofmann and colleagues (2014) demonstrated how experiencing a moral situation influences subsequent moral judgments and decisions in our everyday lives. This research compliments earlier laboratory research that has robustly shown how experiencing a social dilemma(s) shapes subsequent social decision-making (Axelrod, 1984). In 1981, Axelrod & Hamilton used a multi-round Prisoner's Dilemma paradigm to evaluate which types of social decision making strategies result in the best outcomes. Noticing the most successful strategy was for players to cooperate on the first move and then mimic their opponent's preceding move on their second, Axelrod & Hamilton (1981) described this phenomenon as the *Tit-for-Tat* strategy. Taken in combination with findings from other research that players in multi-round trust games alter their behaviors or strategies in response to new information about the other players (Bower, Garber, & Watson, 1996), and that cooperation in the single trial prisoner's dilemma is frequently attributed to peoples' efforts to replicate the cooperation levels others display towards them (Hofstadter, 1985), we begin to gain an understanding of how previous exposure to social dilemmas influences decision making in a follow up task.

While a plethora of research regarding iterated social dilemmas exists on the effects of previous experience on social behavior (Axelrod & Hamilton 1981; Rand et. all, 2014; Nowak & Sigmund, 1993), little research has been done on the effects of how having to make one social decision directly influences follow up decisions. In the present study, we build on Hofmann and colleagues (2014) finding and Axelrod & Hamilton's (1981) methodology by linking two unrelated social dilemmas together to explore the relationship between experiencing a social dilemma and making an unrelated social decision. To do this, we used a modified version of the

Prisoner's Dilemma as the independent variable and a separate social decision as the dependent variable.

### **Social dilemmas and moral depletion**

For our first hypothesis we predicted that making a choice within a social dilemma would lead to increases in selfish decision making in a follow up task. We made this prediction based on the theories of moral identity (Aquino & Reed, 2002), social dilemmas as conflicts of self-control (Sheldon & Fishbach, 2015), and ego-depletion (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Baumeister, Vohs, & Tice, 2007). Just like we are motivated to see ourselves as healthy and successful (e.g., oriented towards health and financial goals), we are also motivated to see ourselves as moral and cooperative (e.g., Aquino & Reed, 2002). Recently, ethical dilemmas (tradeoffs involving honesty & deception) have been characterized as conflicts of self-control and research using this theorizing has found that factors that facilitate self-control for other types of goals (e.g., health and financial) also promote ethical behavior (Sheldon & Fishbach, 2015). We posit that theorizing ethical dilemmas as conflicts of self-control should also extend to the selfish and cooperative tradeoffs made within social dilemmas. When people experience a social dilemma they must exercise self-control regardless of the decision that they make. If they decide to be selfish (e.g., defect) they must negate their moral or cooperative motives (Rand, Greene, & Nowak, 2012). Conversely, if they decide to cooperate they must negate their self-interested motives (Bocain & Wojciszke, 2014). One theory of self-control, ego-depletion posits that regulating oneself is mentally taxing, and this mental taxation negatively affects performance in subsequent decisions requiring self-control (Muraven, Tice & Baumeister, 1998; Muraven & Baumeister, 2000). With this, we hypothesize that by experiencing a social dilemma, regardless of the outcome, a person becomes morally depleted. This moral depletion

then negatively effects a person's own motivation to see themselves as moral and cooperative, in turn causing them to act more selfishly in a social decision that follows.

### **Betrayal and selfishness**

For our second hypothesis, we believed that being betrayed in a social dilemma would negatively influence pro-social decision-making more than being shown loyalty. Based on extensive literature describing how the experience of betrayal has several negative outcomes related to one's psychological health, happiness, and wellbeing, and results in a prototypically negative emotional experience (Fitness 2001; Jones & Burdette, 1994; Rachman, 2010; Fehr & Baldwin, 1996), we thought that the negative emotional and social experiences associated with being betrayed would results in higher levels of selfish decision making in a succeeding social decision. More specifically, we believed we would find a moral contagion effect (Hofmann, Wisneski, Brandt, & Skitka, 2014) where becoming the target of an immoral act (e.g. experiencing betrayal) would result in people being more likely to do make a negative choice in social decision that follows.

## **Method**

### **Overview of the current study**

To test our two hypotheses, we randomly assigned participants to one of three conditions: loyalty, betrayal, or no social dilemma. The study consisted of two phases:

**Phase 1.** Baseline affect and social connectedness were recorded via questionnaires administered on Qualtrics. Next, participants in the loyalty and betrayal condition were given two \$5 bills each, while participants in the no social dilemma condition were given one \$5 bill. Participants in the loyalty and betrayal conditions were instructed that they would use one of the \$5 bills in the first task, and should hold onto the second \$5 bill until the second task. Then,

participants in the loyalty and betrayal conditions experienced a social dilemma by taking part in a modified version of the Prisoner's Dilemma (PD). As part of the modified PD participants contributed one \$5 bill each to create a \$10 prize. They were also led to believe that a fellow participant had either cooperated with (loyalty condition) or defected from them (betrayal condition). Participants in the no social dilemma condition did not experience the modified PD; they remained at their computer and were asked to make a social decision of what to do with their \$5 bill.

**Phase 2.** After playing the game, participants in the loyalty and betrayal conditions were asked about whether they would like to keep or give away \$5 that the experimenter had given them as part of the cover story at the beginning of the study. This allowed us to compare the differences in social decision-making (e.g. what to do with \$5) between those who just made a decision in a social dilemma and those who had not. Additionally, participants in the loyalty and betrayal conditions were asked to report their current levels of emotion and social connectedness.

### **Participants**

Participants were recruited from the University of Michigan Psychology Paid Subject Pool and included one hundred and ninety seven adults aged 18 and over. Participants were offered the opportunity to earn up to \$15 by answering several survey questions, taking part in a game, and making a social decision. In addition to the 197 participants, we excluded 26 other individuals from our analyses because they had either, taken part in a previous version of our study which was similar, or did not agree to split the jackpot with each other during the modified Prisoner's Dilemma. The average participant age was 21.37 ranging from a minimum of 18 to a maximum of 54, while participant gender breakdown was 73.1% female (N = 144), 26.4% male

(N = 52), and 0.5% another sex identity (N = 1).

### **Cover Story**

We told participants that they would be taking part in a study on personality and economic decision-making. Participants assigned to the loyalty and betrayal conditions were told they would be taking part in a game together, and as such each given two \$5 bills before playing together. They were instructed that the first \$5 bill would be used while playing the game, and that they should hold onto the second \$5 bill until they were asked to make a social decision about how they would like to distribute or keep their compensation. Participants were further instructed that the research assistant would indicate when it was time to make the decision with the second \$5 bill.

Participants assigned to the no social dilemma condition did not take part in the game, and consequently only received one \$5 bill to be used in a social decision regarding their compensation. These participants were given their \$5 bill in phase one, directly after completing the baseline affect and connected questionnaire.

To add to the realism of the money being at stake, research assistants collected the \$5 bills (promising to hold onto the money and distribute as appropriate based on the participant's choices) before any decisions were made in either the social dilemma in task one or the social decision in task two. Although participants were led to believe their decision of what do with their \$5 in compensation was real, at the end of the study all participants received at least \$5 from the second task (regardless of the option they actually chose).

### **Materials**

**Baseline Affect and Connectedness Questionnaire.** Immediately after the informed consent process and directly after being assigned their experimental condition, each participant

was asked the following questions Q1-Q7 (see Table 3 for means and standard deviations). The order of Q2, Q3 were fixed as the first two questions, while order randomization was applied to Q1, & Q4-Q7.

*Q1.* How close do you feel to the other participant?

*Q2.* How do you feel?

*Q3.* How aroused are you?

*Q4.* How angry are you?

*Q5.* How happy are you?

*Q6.* How sad are you?

*Q7.* How do you feel socially right now?

**Task one (e.g. social dilemma).** We used a modified Prisoner's Dilemma with the following design. Participants were first placed across from one another at a table with two golden balls in front of each of them. They were then told that each ball either contains the word split or steal, and they would now have to make a decision about whether to split or steal a \$10 prize. After collecting \$5 from each participant (as the contribution to the prize), the research assistant then instructs the participants that depending on their decision the prize will be allocated as follows. If both participants actually choose the split ball, the prize will be shared fifty-fifty, or \$5 each. This condition produces a mutual benefit to both individuals, and operationalizes the cooperating conditions in the original prisoner's dilemma. Conversely, if both participants actually choose the steal ball, neither will receive any portion of the prize. This serves as our defection operationalization as similarly to both being locked up five years in the original dilemma, the decision to defect results in negative consequences for both participants. Lastly, if one participant actually chooses the steal ball, while the other participant actually

chooses the split ball, the participant who chose the steal ball will win the entire prize (\$10). This operationalizes the remaining two conditions in the original dilemma in which one individual gets off completely (a large benefit), while the other individual gets a long prison sentence (an extremely negative consequence, just like receiving none of the prize). Participants in the loyalty condition who chose to split (e.g. all loyalty condition participants we included in our analyses) were told the other participant also decided to split and as such, attained a mutually beneficial outcome (\$5). Participants in the betrayal condition were told the other participant decided to steal, regardless of whether they actually chose to split or steal. As such, they attained the highly negative outcomes in which they received \$0 (believing that the other participant had actually chosen steal and betrayed them).

**Post-social dilemma appraisal questionnaire.** Immediately after participants in the loyalty and betrayal conditions received notification as to what their partner had decided to do they were asked the following questions Q1-Q13 (see Table 4 for means and standard deviations). The order of Q2, Q3, Q8, Q9, and Q13 were fixed, while order randomization was applied to Q1, & Q4-Q7, Q11-Q12.

*Q1.* How close do you feel to the other participant?

*Q2.* How do you feel?

*Q3.* How aroused are you?

*Q4.* How angry are you?

*Q5.* How happy are you?

*Q6.* How regretful are you?

*Q7.* How sad are you?

*Q8.* How do you feel socially right now?

*Q9.* How do you feel about the other participant?

*Q10.* How do you feel about yourself?

*Q11.* How much do you want to harm the other participant emotionally?

*Q12.* How much do you want to harm the other participant physically?

*Q13.* If you were to play this game again with the same person what is the likelihood that you would change your decision?

**Task two (e.g. social decision).** In the final phase of the study participants were presented with four unique choices of what to do with the \$5 bill they received earlier on in the study. The four choices were as follows:

*Selfish.* Participants could choose to simply keep the \$5.

*Cooperative.* Participants could choose to keep half of their \$5 compensation and send the other half as an unexpected bonus to a future participant.

*Parochial.* Participants could choose to send the \$5 in the form of a gift card and a nice note to a friend or family member of their choosing.

*Altruistic.* Participants could choose to donate the \$5 to a charity of their choice, and the \$5 donation would be doubled to \$10.

## Results

### Hypothesis I

To test our first hypothesis, that experiencing a social dilemma would negatively influence pro-social decision-making, we determined the proportion of selfish, cooperative, parochial and altruistic decisions made by subjects within all three experimental conditions (loyalty, betrayal, no social dilemma) (see Table 1). Interestingly, although enough participants in the no social dilemma condition chose to act parochially (17.5%), or cooperatively (14.3%)

within the decision in our second task, the extremely low rate at which those in the loyalty or betrayal condition chose to act cooperatively (loyalty, 1.4%; betrayal, 3.2%) or parochially (loyalty, 0.0%; betrayal, 8.1%) initially prevented us from running a valid cross tabulation. This was due to the total number of participants making each respective choice within both conditions being five or less. However, seeing as our operationalized conceptions of parochial, cooperative, and altruistic decisions were all pro-social in nature, we decided to collapse the categories into one category (pro-sociality). Creating a large enough sample size across two behavioral dimensions (selfishness and pro-sociality), we observed large differences in the frequency of pro-social and selfish decisions between participants in the no social dilemma condition, and participants in either the loyalty, or betrayal conditions (see Table 2).

We recoded the loyalty and betrayal conditions into a new social dilemma variable ( $N = 134$ ) that is representative of all non-excluded participants who took part in the primary social dilemma. A chi-square test of independence was calculated comparing the task two decisions of those in the social dilemma condition to the task two decisions of those in the no social dilemma condition. As predicted, there was a significant relationship between being in the social dilemma condition and decision making in task two,  $\chi^2(2, 197) = 26.98, p < .001, OR = 0.18 [0.09, 0.33]$ , suggesting that participants who played the game in task one (e.g. the social dilemma) were nearly twice as likely to keep the five dollars for themselves compared to participants who did not play the game in task one (see Figure 1).

## **Hypothesis II**

We also hypothesized that experiencing betrayal (more so than loyalty) within a social dilemma would negatively influence how likely participants would be to give \$5 away to another person or charity after they participated in the prisoner's dilemma game. To address this question

we examined how participants in the loyalty condition ( $N = 72$ ) differed from participants in the betrayal condition ( $N = 62$ ) on selfish and pro-social behavior in task two. Contrary to our hypothesis, we found no significant differences in selfish or pro-social decision making between participants that experienced loyalty or betrayal while participating in the preceding social dilemma,  $\chi^2(1, 134) = .56, p = .456$  (see Figure 2).

### **Self-report measures**

Groups did not differ significantly at baseline on any of the questionnaires we administered (see Table 3). However when we looked at how participants felt emotionally and socially after taking part in the social dilemma, significant differences (between those who had experienced either loyalty or betrayal) were found across nearly every emotional and social dimension question (see Table 4). In fact, while participants in the betrayal condition displayed higher levels of anger ( $M = 3.39, SD = 1.7, p < .001$ ), regret ( $M = 3.5, SD = 1.86, p < .001$ ), sadness ( $M = 3.39, SD = 1.74, p < .001$ ), desire to emotionally harm the other participant ( $M = 1.07, SD = 0.31, p < .001$ ), and willingness to play again with the same partner ( $M = 3.55, SD = 2.1, p < .001$ ), participants in the loyalty condition displayed higher feelings of closeness to the other participant ( $M = 4.13, SD = 1.29, p < .001$ ), valence ( $M = 6.25, SD = 1.05, p < .001$ ), happiness ( $M = 5.85, SD = 1.02, p < .001$ ), attitude towards others ( $M = 6.17, SD = 0.92, p < .001$ ), and attitudes towards themselves ( $M = 6.14, SD = 1.07, p < .001$ ). The only emotional affect question for which no significant differences were found was arousal ( $M = 3.47, SD = 1.7, p = 0.78$ ).

It is striking that these differences in subjective experience, did not translate into subsequent behavioral effects on the decision to give money to someone else (i.e., our second hypothesis). However, it is well established that responses assessed across different levels of

analysis (e.g., subjective report and behavioral) do not always adhere (Vinski & Watter, 2012; Jack & Roepstorff, 2002; Orne, 1962). Future research is needed to address this issue further, as we elaborate on below.

### **Discussion**

Our finding that participants in the social dilemma condition made significantly more selfish decisions than participants in the no social dilemma condition supported our original hypothesis that taking part in a social dilemma negatively influences pro-social decision-making. This finding suggests that experiencing a social dilemma, regardless of the outcome, causes a person to behave more negatively. Seeing as one major difference between participants in the no social dilemma and social dilemma condition was participation in a social dilemma task, it appears that somehow taking part in our modified PD affected subjects' subsequent social decision making. More specifically, on the surface it appears that playing our game resulted in subjects generally acting more selfishly during our second social decision making task. On the basis of this finding, we speculate that taking part in a social dilemma results in depletion of the resources needed to exert self-control in a moral decision making task (Sheldon & Fishbach, 2015; Sowden & Kross, in-prep), and that differences in depletion of self-control between those in the social dilemma and no social dilemma conditions drove the effect of social dilemma on increasing selfish decision making. However, because we did not incorporate an index of depletion into our present design we cannot conclude that moral depletion drives this effect. Future research is needed to address this issue. Additionally, there may be other factors at play driving this effect either alone or in combination with one another, ranging from the ideas surrounding how money being at stake influences our moral judgments and decision making, to the effects that socializing with other individuals have on those same instances of moral

judgments and decision making. Future research is needed to follow-up on these ideas as well.

Our second hypothesis that experiencing betrayal by one's (game) partner would negatively influence pro-social decision-making, more so than experiencing loyalty does, was not supported by our findings. This being the case, we then sought to analyze the baseline and post-dilemma affect and connected questionnaire responses for any insights into why our hypothesis was unsubstantiated. We noted that while there were no significant differences in baseline affect and connectedness between those in the loyalty and betrayal conditions, across the board differences were found in post-dilemma appraisals for every category except arousal. Observing that the post dilemma appraisals measuring emotional experiences such as happiness, sadness and regret differed significantly between those in the loyalty and betrayal conditions, with participants in the loyalty group showing more happiness, valence, feelings of closeness to the other participants, and feelings of social connectedness, it is clear that taking part in one condition or the other resulted in distinct emotional experiences. However, even with finding large differences in post dilemma emotional experience and social connectedness between groups, it is possible we did not find an effect of condition (loyalty vs. betrayal) on social decision in task two because something other than emotion or social connectivity is driving any true effects.

### **Future Studies**

Although these findings raise multiple ideas for future research, finding a means to mitigate the differences we found in pro-social behavior between the social dilemma and no social dilemma conditions stands out as most important. First, I would like to test whether employing a self-distancing intervention could change any of the differences we found in pro-social and selfish behavior between the social dilemma and no social dilemma conditions. More

broadly, future research is needed to examine how people can regulate their moral reasoning.

Adam Smith suggested that the ability to examine one's feelings and behaviors from a third party observer perspective is required for the development of a moral self (Smith, 1790). He argues that examining one's feelings and behaviors from a third party observer perspective results in people both, developing enhanced emotional control and placing more weights on the rights and interests of others (e.g. a fundamental aspect of pro-sociality). While an existing body of literature has shown that self-distancing does indeed enhance emotional control (Ayduk & Kross, 2010; Kross & Ayduk, 2011), virtually no research has examined the second portion of his claim that self-distancing will increase pro-sociality.

Second, I would like to see how having participants build up a relationship across multiple rounds of the game before making a second social decision about what do with their compensation, affects post dilemma emotional experience, social connectedness, and selfish and pro-social decision making. This is an important question to ask because in real world decision making people's decisions of whether to cooperate with or defect from another frequently depend on how positively or negatively they view their previous interactions with that individual. In allowing participants to build stronger relationships before making a social decision about their compensation, they will learn more information about each other's decision-making behavior. Depending on the type and context of this additional information, having it could lead participants to display higher (or lower) differences in selfish and pro-social behavior between groups.

Third, noting that previous research has speculated that differences in emotional responses to social situations underlie our social decision-making (Jones & Burdette, 1994; Rachman, 2010), I plan to test whether controlling for emotional experience could reveal any

possible effects we missed between loyalty and betrayal conditions and the social decision in task two. On the surface it is possible that when how negatively the participants felt after being betrayed in our task one is taken into account, being betrayed leads to participants choosing the pro-social (cooperative, parochial, or altruistic) choice in our social dilemma more often than their counterparts in the loyalty condition. Thinking about this from a personal perspective, a person who feels really bad about being betrayed by someone could very well behave differently from a person who does not feel as bad about the betrayal.

### **Conclusion Statement**

In conclusion, our finding that social dilemmas in and of themselves influence subsequent moral judgment and decision-making could have important theoretical and practical implications. By incorporating indices for moral depletion and self-control in future research, we can further isolate the mechanisms behind our observed effect of social dilemma condition on selfish decision-making in task two. Noting that our second hypothesis that betrayal would influence selfish decision making in task two more so than loyalty did was unsubstantiated, these results appear to demonstrate that although experiencing a social dilemma makes a person more selfish, how that person is treated while in the social dilemma does not. However, to fully understand this finding, we explored the pre- and post-dilemma questions that we asked the participants to see if incorporating those representative psychological processes could shed insight into this observation. Despite finding significant differences in post dilemma affect and connectedness between loyalty and betrayal condition participants, no significant differences in selfish or pro-social decision-making were observed. Perhaps though factors such as emotional valence (reported strength of the feeling) need to be accounted for in order for effects such as betrayal on pro-sociality to reveal themselves. Future research would do well to explore this.

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## Tables

Table 1.

*Proportion of Selfish, Cooperative, Parochial, and Altruistic Decisions by Experimental Condition*

Condition	Selfish	Parochial	Altruistic	Cooperative
Loyalty	53 (73.6%)	0 (0%)	18 (25%)	1 (1.4%)
Betrayal	42 (67.7%)	5 (2.3%)	13 (21%)	2 (3.2%)
No SD	18 (28.6%)	11 (17.%)	25 (39.7%)	9 (14.3%)
Total	113 (57.4%)	16 (8.1%)	56 (28.4%)	12 (6.1%)

*Note:* Table 1 shows the proportion of selfish, cooperative, parochial and altruistic decisions made by subjects within all three experimental conditions [loyalty, betrayal, (No SD = no social dilemma)]

## SOCIAL DILEMMAS AND SOCIAL DECISION-MAKING

Table 2.

*Proportion of Selfish and Pro-Social Decisions by Experimental Condition*

Condition	Selfish	Pro-Social
Loyalty	53 (73.6%)	19 (26.4%)
Betrayal	42 (67.7%)	20 (32.3%)
No Social Dilemma	18 (28.6%)	45 (71.4%)
Total	113 (57.4%)	84 (42.6%)

*Note:* Table 2 shows the proportion of selfish or pro-social (cooperative, parochial, or altruistic) decisions made by subjects within all three experimental conditions [loyalty, betrayal, control e.g. no social dilemma)].

SOCIAL DILEMMAS AND SOCIAL DECISION-MAKING

Table 3

*Differences in Baseline Affect and Connectedness Between Social Dilemma Condition*

*Participants*

	Close	Valence	Arousal	Angry	Happy	Sad	Connected
Loyalty	1.67 (1.2)	5.68 (1.1)	2.85 (1.47)	1.78 (1.18)	5.14 (.98)	2.44 (1.17)	4.46 (1.7)
Betrayal	1.81 (1.13)	5.69 (1.07)	3.16 (1.6)	1.68 (1.07)	5.02 (1.17)	2.15 (1.13)	4.63 (1.44)
Sig.	$p = .332$	$p = .694$	$p = .321$	$p = .784$	$p = .803$	$p = .301$	$p = .823$

*Note.* Means (Standard Deviations). Table 3 shows that there is no difference between the two social dilemma groups (loyalty and betrayal conditions) on any of the items from the baseline affect and connectedness questionnaire.

SOCIAL DILEMMAS AND SOCIAL DECISION-MAKING

Table 4

*Differences in Post Dilemma Affect and Connectedness Between Social Dilemma Condition*

*Participants*

	Close	Valence	Arousal	Angry	Happy	Regretful	Sad
Loyalty	4.13 (1.29)	6.25 (1.05)	3.47 (1.7)	1.31 (.69)	5.85 (1.02)	1.53 (.95)	1.57 (.99)
Betrayal	1.89 (1.33)	3.16 (1.66)	3.39 (1.73)	3.9 (1.87)	3.47 (1.34)	3.5 (1.86)	3.39 (1.74)
Sig.	$p < .001^*$	$p = < .001^*$	$p = .78$	$p < .001^*$	$p < .001^*$	$p < .001^*$	$p < .001^*$

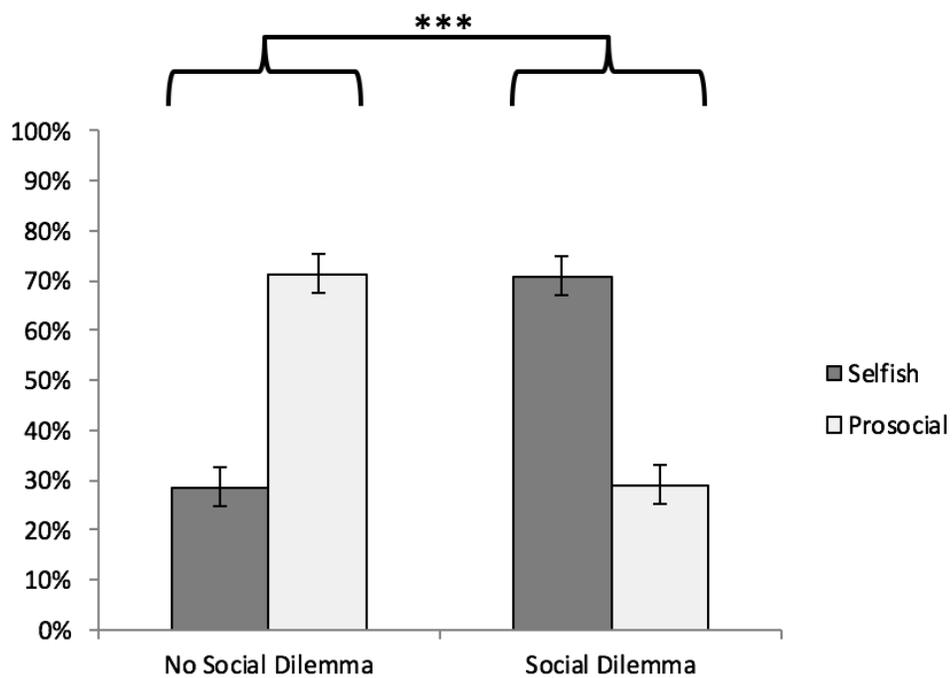
  

	Connected	Attitude - other	Attitude - self	Harm - emotional	Harm – physical	Play again
Loyalty	5.28 (1.27)	6.17 (.92)	6.14 (1.07)	1.07 (.31)	1.03 (.17)	1.85 (1.16)
Betrayal	3.48 (1.49)	2.89 (1.34)	5.11 (1.54)	1.87 (1.43)	1.4 (.97)	3.55 (2.1)
Sig.	$p < .001^*$	$p < .001^*$	$p < .001^*$	$p < .001^*$	$p = .004^*$	$p < .001^*$

*Note:*  $p < 0.05$  are noted with a \*. Table 4 shows that across all of the items (minus arousal<sup>1</sup>) in the post-dilemma appraisal questionnaire there are differences between the loyalty and betrayal conditions.

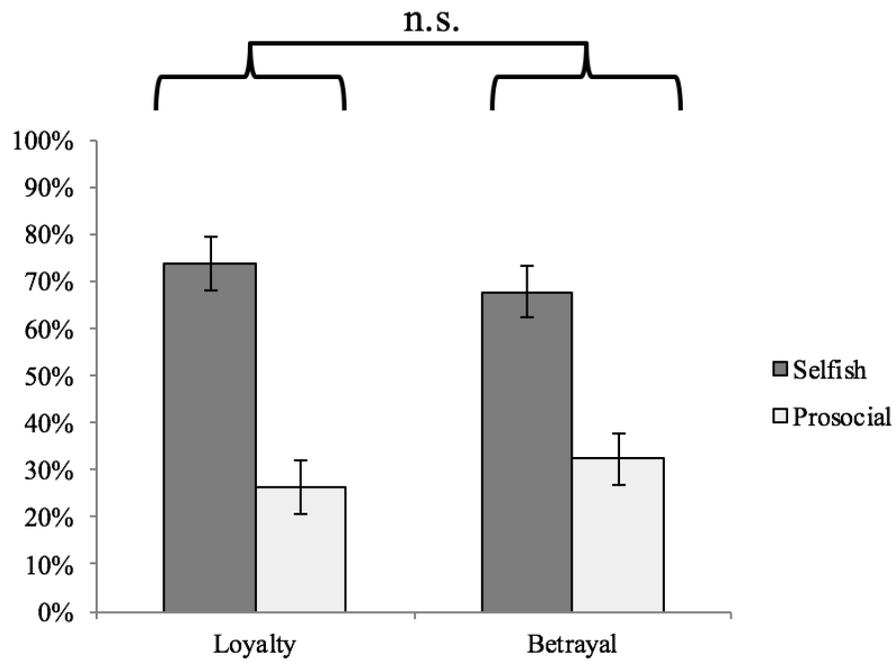
<sup>1</sup> Which may be explained by the awkwardness of the question; in future studies, especially with undergraduates, we should probably not use arousal and instead use “excited” or something similar

Figures



$$X^2 (1, n = 197) = 26.98, p < .001, OR = .172 [.088, .334]$$

Figure 1. Figure 1 shows the differences in selfish and pro-social behaviors between participants in the social dilemma and no social dilemma conditions.  $X^2 (1, n = 197) = 26.98, p < .001, OR = .172 [.088, .334]$ .



$$X^2 (1, n = 134) = .56, p = .456, OR = 1.33 [.629, 2.804]$$

*Figure 2.* Figure 2 shows there no real differences in instances of selfish or pro-social behavior between participants in either the loyalty or betrayal conditions,  $X^2 (1, n = 134,) = 0.56, p = .456,$  OR = 1.33 [.629, 2.804].